Blayney Shire Council

6 March 2013

Dear Councillor,

Your attendance is requested at an Ordinary Council Meeting of the Blayney Shire Council to be held in the Chambers, Blayney Shire Community Centre on Monday, 11 March 2013 at 6.00 pm for consideration of the following business -

(1) Acknowledgement of Country
(2) Recording of Meeting Statement
(3) Apologies for non-attendance
(4) Confirmation of Minutes - Ordinary Council Meeting held on 11.02.13
(5) Matters arising from Minutes
(6) Disclosures of Interest
(7) Reports of Staff
    (a) Corporate Services
    (b) Engineering Services
    (c) Environmental Services
(8) Committee Reports

Yours faithfully

Anton Franze
ACTING GENERAL MANAGER

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Appendix A

Extracts from Austroads - Pavement Design: A Guide to the Structural Design of Road Pavements (1992)

7 DESIGN TRAFFIC

7.1 GENERAL

This section contains procedures for assessing traffic loadings for the design of flexible and rigid pavements and for the design of overlays.

The general procedure used is shown in Figure 7.1. Detailed procedures depend on the type of traffic data available, the pavement type being designed and the design method adopted.

Features of traffic that largely determine performance are:

- The number of axle passes
- The axle loadings
- The axle configurations.

For all pavements, performance is influenced only by the heavy end of the traffic spectrum. No account need be taken of cars and light commercial vehicles as far as loadings are concerned though their existence may affect road capacity (Section 7.3).

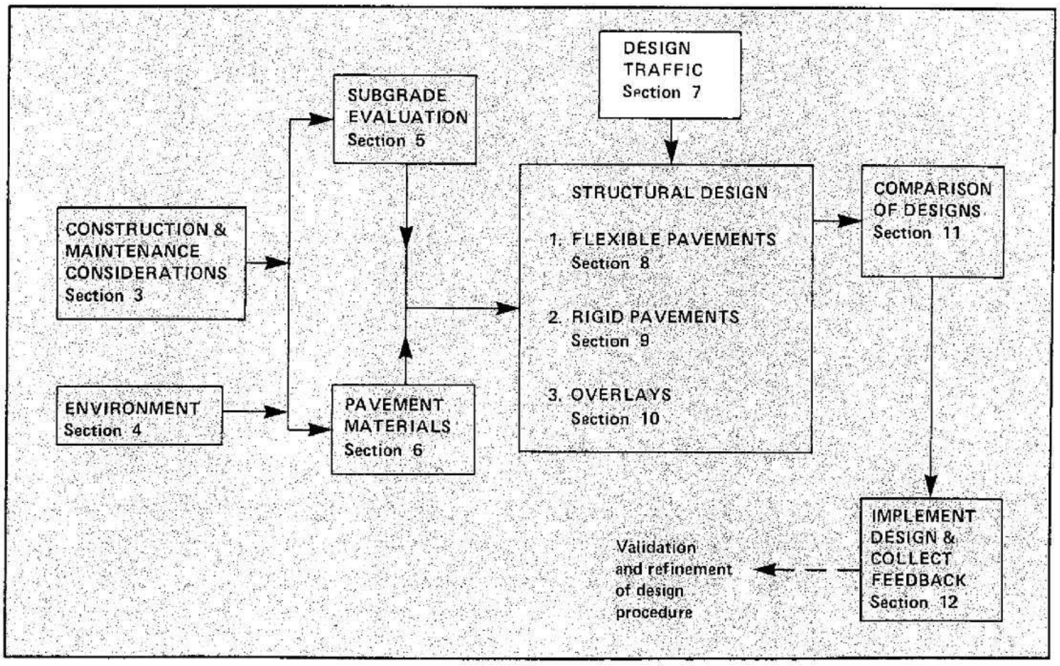
7.1.1 Axle Configurations and Equivalencies

The damage due to different axle groups is dependent on the axle spacing, the number of tyres per axle, the load on the group and the suspension. For design purposes, it is generally appropriate to consider axle groups in terms of the following four types:

- single axle with single wheels
- single axle with dual wheels
- tandem axles both with dual wheels
- tri-axles all with dual wheels

The relative damage associated with any particular axle load can be expressed in terms of relationship as shown in Table 7.1.

The standard axle is defined as a single axle with dual wheels that carries a load of 8.2 t. Loads on the axle configurations given above that cause the same amount of damage as the standard axle are given in Table 7.1.



For axle group loads other than those in Table 7.1, the damage caused is expressed as the number of standard axles which produce the same damage and is calculated as follows:

$$\text{No of standard axles for same damage} = \left[\frac{\text{Load on Axle Group}}{\text{Appropriate Load from Table 7.1}}\right]^{EXP}$$

Where the exponent EXP may vary depending on the type of pavement. Commonly a value of 4 is adopted for the exponent in which case the number of standard axles for the same damage is termed the number of equivalent standard axles (ESAs).

Tandem axles which have dual wheels on one axle and single wheels on the other may be considered to be equivalent to tandem axles (both with dual wheels), which are loaded to 1.2 times the load on the six-wheeled tandem.

Spread Tandem axles, because of their wide axle spacings, (more than 2.4m) can be regarded as two single axles with the total load on the spread tandem configuration being divided equally between the two single axles.

For the design of flexible pavements, twin steer axles may be considered to be equivalent to tandem axles (both with dual wheels) which are loaded to 1.5 times the load on the twin steer axles. For the design of rigid pavements they may be considered to be equivalent to tandem axles (both with dual wheels) which have the same load as the twin steer axles.

7.1.2 Design Lanes

Construction of new pavements and overlaying of existing pavements usually affects two or more traffic lanes. It is usual practice to adopt the same pavement design for all lanes. The design traffic should be that in the lane which carries the most commercial vehicular traffic and it is designated the design lane.

TABLE 7.1
AXLE LOADS WHICH CAUSE EQUAL DAMAGE

Axle Configuration	Single Single	Single Dual	Tandem Dual	Triaxle Dual
Load (kN)	53	80	135	181

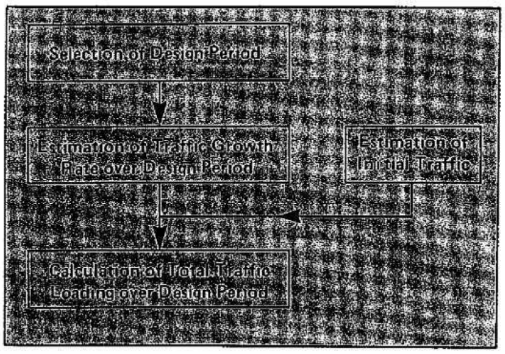


FIGURE 7.1
PROCEDURE FOR DETERMINING DESIGN TRAFFIC

7.2 DESIGN PERIOD

The design period is the length of time expressed in years before it is anticipated that rehabilitation of the pavement will be necessary to restore shape, repair other forms of distress, or to provide additional pavement strength.

Rehabilitation, which may consist of granular or asphalt overlay, major patching or improvements or removal of selected areas of pavement materials, initiates a new design period.

In this regard, resurfacing a pavement with a sprayed seal or a very thin asphalt overlay does not in itself constitute rehabilitation in the pavement design sense.

Some typical design periods are outlined below:

- New granular pavements = 20 - 25 years
- New rigid pavements = 20 - 40 years
- Asphalt overlays = 10 - 15 years
- Granular overlays = 10 - 20 years

Various factors will influence the choice of design period. They include:

- Maintenance strategies. Highly trafficked facilities will demand long periods of low maintenance.
- Funding considerations.
- Other factors, such as inadequate geometry or traffic capacity, may limit the life of the roadway and necessitate early reconstruction.

7.3 TRAFFIC GROWTH

Based on road traffic survey information, it is reasonable, in most circumstances, to assume that traffic volumes will increase geometrically either for the entire design period or up to a stage where "road capacity" is reached (in which case traffic volumes are assumed to remain constant for the remainder of the design period.

If there is an indication that "road capacity" is likely to be reached within the design period, it is recommended that the designer establish that there is no planned upgrading of the road geometry within the design period before he adopts "no growth" traffic volume for the period of "full capacity". Adoption of "no-growth" traffic volumes for a period of "saturation" will entail modification of the approach used below to aggregate daily traffic volumes for total design traffic.

For geometric traffic growth throughout the design period, total traffic over the design period is determined by multiplying the total traffic in the first year by the appropriate Cumulative Growth Factor from Table 7.2.

7.4 METHODS OF CALCULATION OF DESIGN TRAFFIC

The method to be used depends on the traffic data that are available and the design procedure to be adopted.

Ideally the traffic data should include the numbers of and loading on each axle type in the traffic stream.

TABLE 7.2 CUMULATIVE GROWTH FACTORS (GF)

Design Period (Years)	Growth Rate (% pa) 0	2	4	6	8	10
5	5	5.2	5.4	5.6	5.9	6.1
10	10	10.9	12.0	13.2	14.5	15.9
15	15	17.3	20.0	23.3	27.2	31.8
20	20	24.3	29.8	36.8	45.8	57.3
25	25	32.0	41.6	54.9	73.1	98.3
30	30	40.6	56.1	79.1	113.3	164.5
35	35	50.0	73.7	111.4	172.3	271.0
40	40	60.4	95.0	154.8	259.1	442.6

In many cases information at this level of detail is not available and recourse will have to be made to survey information.

This guide caters for three levels of traffic data:

(i) initial annual average daily number of axles by type and by load
(ii) initial annual average daily number of axles by type
(iii) initial annual average daily traffic (AADT) plus percent commercial vehicles.

The application of these data to the design procedures is shown in Table 7.3.

7.5 DESIGN TRAFFIC FOR FLEXIBLE PAVEMENTS CONTAINING ONE OR MORE BOUND LAYERS

7.5.1 For Traffic in Terms of Annual Average Daily Number of Axles by Type and by Load

Because asphalt, cemented materials and subgrades each have different performance relationships (allowable number of strain repetitions vs level of strain), it is necessary to determine separately for each material the number of standard axles which will cause the same level of accumulated damage as the actual traffic load spectrum. Hence the following three distinct parameters may be required:

- Number of standard axles that produce the same cumulative damage in asphalt as the design traffic (N_{SA})
- Number of standard axles that produce the same cumulative damage in the subgrade as the design traffic (N_{SS})
- Number of standard axles that produce the same cumulative damage in cemented materials as the design traffic (N_{SC}).

Initial annual average daily values of these parameters N_{SA}, N_{SS}, N_{SC} are calculated using method 1 of Appendix E.

TABLE 7.3 APPLICATION OF TRAFFIC DATA TO DESIGN PROCEDURES

Design Procedure	Traffic Data Available: Annual Average daily number of axles by type & load	Annual Average daily number of axles by type	AADT and percent Commercial Vehicles	Specialised Loading
Flexible pavements containing one or more bound layers	Sec 7.5.1 & Appendix E method 1	Sec 7.5.2 & Appendix E method 2	Sec 7.5.3 & Appendix E method 3	Sec 7.5.4
Flexible pavements consisting of unbound granular materials	Sec 7.6.1 & Appendix E method 4	Sec 7.6.2 & Appendix E method 2	Sec 7.6.3 & Appendix E method 3	Sec 7.6.4
Rigid Pavements	Sec 7.7.1	Sec 7.7.1	N/A	N/A
Overlays for flexible pavements	Sec 7.6.1 & Appendix E method 4	Sec 7.6.2 & Appendix E method 2	Sec 7.6.3 & Appendix E method 3	N/A

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1.

7.5.2 For Traffic in Terms of Annual Average Daily Number of Axles by Type.

The three required design parameters are as defined in Section 7.5.1. Annual average daily number of ESAs, N is calculated using method 2 of Appendix E.

N_{SA} N_{SS} and N_{SC}, as defined in Section 7.5.1, are then calculated as:

$$N_{SA} = 1.1\,N_E$$
$$N_{SS} = 1.1\,N_E$$
$$N_{SC} = 20.0\,N_E$$

These constants have been calculated using the procedure described in method 1 of Appendix E using the traffic distribution given in Table 8.3. If a different traffic distribution is to be used the method described in Section 7.5.1 should be used.

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1(a).

7.5.3 For Traffic in Terms of Annual Average Daily Traffic (AADT) and Percentage of Commercial Vehicles.

The three required design parameters are as defined in Section 7.5.1. Annual average daily number of ESAs, N_E is calculated using method 3 of Appendix E.

N_{SA}, N_{SS} and N_{SC} as defined in Section 7.5.1, are then calculated as follows:

$$N_{SA} = 1.1\,N_E$$
$$N_{SS} = 1.1\,N_E$$
$$N_{SC} = 20.0\,N_E$$

These constants have been calculated using the procedure described in method 1 of Appendix E using the traffic distrubution given in Table 8.3. If a different traffic distribution is to be used the method described in Section 7.5.1 should be used.

The design loading is then calculated as follows. Design number of standard axles for:

asphalt = N_{SA} x 365 x GF
subgrade = N_{SS} x 365 x GF
cemented materials = N_{SC} x 365 x GF

where GF is the cumulative growth factor from Table 7.2. These values are used as input to steps 10, 15 and 16 of the design procedure outlined in Table 8.1.

7.5.4 Specialised Loading

The aim is to analyse the damage caused by each axle/load configuration and to determine the total damage using Miner's Law.

7.5.4.1 Current Traffic Spectrum

For each of the axle types which will use the pavement, estimate from the available data the daily number with loads within specific load ranges. Designate these as N_{cij} where i refers to axle configuration type and j refers to the load magnitudes for configuration i.

7.5.4.2 Growth Factors

Either

(a) Assume that the growth of numbers of all axle configurations and load magnitude will be equal, and select the appropriate factor from Table 7.2, or

(b) Adopt different growth factors for the numbers of different axle configuration and/or load magnitudes depending on the assumed change in the traffic spectra during the design period, selecting appropriate values from Table 7.2.

7.5.4.3 Calculation of Design Traffic

Determine the total number of each load configuration and magnitude which will be applied to the pavement during the design period N_{ij} using the formula:

$$N_{ij} = 365.\,N_{Cij} \times GF_j$$

where GF is the adopted growth factor from Table 7.2 for load configuration i and load magnitude j.

The values of N_{ij} are then used in steps 10, 15, 16 of the mechanistic design procedure described in Table 8.1.

The load magnitudes and configurations themselves are used in steps 11a and 13a of the mechanistic design procedure described in Table 8.1.

7.6 DESIGN TRAFFIC FOR FLEXIBLE PAVEMENTS CONSISTING OF UNBOUND GRANULAR MATERIALS AND OVERLAYS FOR FLEXIBLE PAVEMENTS

7.6.1 For Traffic in Terms of Annual Average Daily Number of Axles by Type and by Load

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 4 of Appendix E.

The design number of ESAs is then calculated as:

$$N_E \times 365 \times GF$$

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.2 For Traffic in Terms of Annual Average Daily Number of Axles by Type

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 2 of Appendix E.

The design number of ESAs is then calculated as:

$$N_E \times 365 \times GF$$

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.3 For Traffic in Terms of Annual Average Daily Traffic (AADT) and Percentage Commercial Vehicles

The design parameter required is the number of ESAs. Annual average daily number of ESAs, N_E, is calculated from method 3 of Appendix E.

The design number of ESAs is then calculated as:

$$N_E \times 365 \times GF$$

where GF is the cumulative growth factor from Table 7.2.

This value is used as input to the design procedure outlined in Section 8.3 for flexible pavements and Section 10.4.5 for overlays.

7.6.4 Specialised Loading

For the design of flexible pavements consisting of unbound granular materials for the case of specialised traffic loading, the design procedure in Section 8.3 is not appropriate. It is necessary to use the Mechanistic Procedure (Section 8.2) and hence adopt the traffic characterisations in Section 7.5.4.

7.7 DESIGN TRAFFIC FOR RIGID PAVEMENTS

7.7.1 Traffic Estimation for Thickness Design Procedure

The design traffic is characterised by the cumulative number of commercial vehicle axle groups expected in the design lane during the design period, together with the proportions of each type of axle group and the distribution of loads on each type of axle group.

Loads on an axle group type are typically grouped into 10 kN intervals. Appendix I contains examples of load distributions.

The design number of commercial vehicle axle groups over the design life of the pavement is given by:

$$C_{ag} = C_d \times 365 \times GF$$

where

C_{ag} = design number of commercial vehicle axle groups.

C_d = initial number of commercial vehicle axle groups per day.

GF = the cumulative growth factor from Table 7.2.

The design procedure in Chapter 9 caters for each of the following axle types:

- single axles with single wheels;
- single axles with dual wheels;
- tandem axles with dual wheels; and
- triaxles with dual wheels.

Other axle types are to be converted to one of the above as follows:

(i) Convert spread tandem axle loads to dual-tyred single axle loads on the basis that a spread tandem axle is equivalent to two dual tyred single axles, each of which has half of the spread tandem axle load.

(ii) Convert twin steer axles to single axles with single wheels on the basis that a twin steer axle is equivalent to two single axles with single wheels, each with half the load.

7.8 INITIAL AND TERMINAL PAVEMENT CONDITIONS

The design procedure for new flexible pavements presented in Section 8.1 is based on the premise that pavement roughness at the end of the design period will be approximately 150 counts/km, assuming that the initial roughness is approximatly 50 counts/km.

A suitable initial roughness value can be determined by measurements of recently constructed pavements. To allow flexibility in the choice of the terminal condition of the pavement, and also to allow for variations in the initial pavement condition the designer may modify the value of design traffic determined above before undertaking the pavement design.

To determine the modified value, the designer enters Figure 7.2 with the already determined design traffic and also the desired ratio of initial/final roughness. The modified design traffic is then read from the vertical axis. For example, if the design traffic as determined above is 10^6 and the designer seeks a pavement design which will result in terminal roughness being four times initial roughness, the value of the modified design traffic is 4×10^5.

This modification applies only to cases where the subgrade strain criterion governs. As a guide, suggested terminal roughnesss values for different classes of road are in Table 7.4.

7.9 MODIFICATION OF DESIGN TRAFFIC TO IMPROVE RELIABILITY OF DESIGN

While the design procedure endeavours to take cognisance of usual variabilities associated with materials and the construction process, there will always be a risk that the pavement will reach the end of its service life before the design period has elapsed. This risk is attributed to, among other things, the uncertainty associated with predictions of the traffic volume and the magnitude of axle group loads over the design period, and uncertainties associated with estimations of average values and variabilities in material properties, layer thicknesses, etc.

Situations arise where the designer may wish to reduce this risk. Examples include high traffic volume facilities where lane closures to effect repairs would cause serious disruptions to traffic flows.

Such risk can be reduced by adopting a more conservative pavement configuration.

A simple method of achieving this is to adopt in the design procedure a value for total traffic over the design period higher than that which is anticipated.

It is suggested that use of a value of up to four times anticipated traffic may be warranted in some situations.

It is to be noted that, with the adoption of conservative designs, their service lives will usually extend beyond the design period.

Often, in the design process, one significant source of uncertainty is associated with prediction of loads on axle groups. If relevant information from weigh-in-motion installations is available to the designer, that portion of risk attributable to this uncertainty is considerably reduced.

In the case of rigid pavements, specific guidance is provided in Section 9.3.6. ❑

TABLE 7.4 VALUES OF TERMINAL ROUGHNESS

NAASRA Road Functional Class[1]	Terminal Roughness NAASRA counts per km
1 and 2	110
3 and 6	150
4, 5, 7, 8 and 9	175

1 For definition of Classes see Appendix A

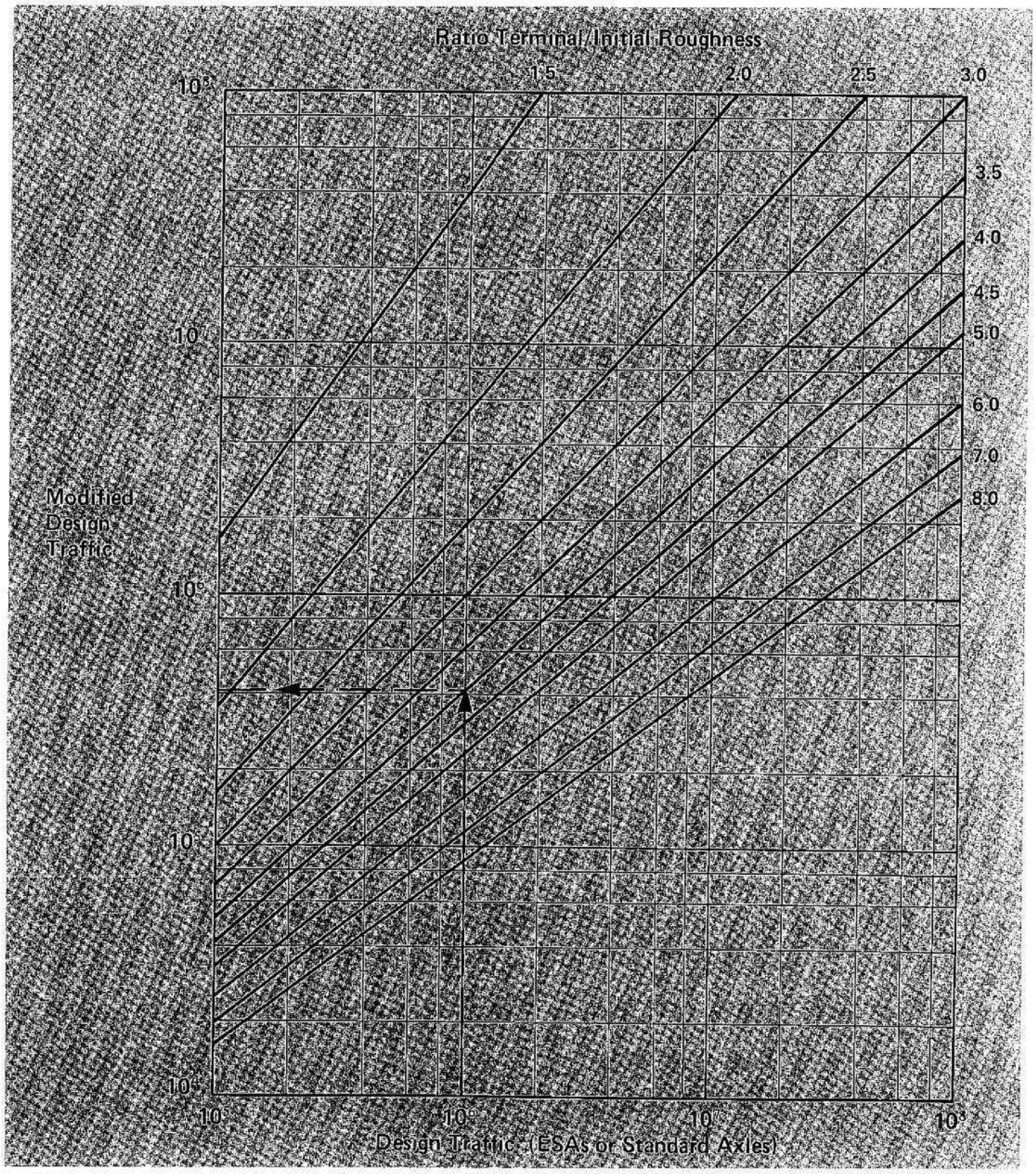


FIGURE 7.2 MODIFIED DESIGN TRAFFIC VS DESIGN TRAFFIC AND RATIO FINAL / INITIAL ROUGHNESS (FOR USE IN DESIGN OF NEW FLEXIBLE PAVEMENTS)

APPENDIX A
TERMINOLOGY

The terminology used in the Guide is basically in accordance with Australian Standard 1348.1 (1986), *Road and Traffic Engineering - Glossary of Terms, Part 1 - Road Design and Construction.* This Appendix lists and defines terms used which do not appear or differ in definition from that shown in AS 1348.1, or accord with AS 1348.1, but which are considered so important within the context of this document to warrant having them reproduced.

DEFINITION OF TERMS

Annual Average Daily Traffic (AADT)

The total yearly traffic volume divided by 365.

California Bearing Ratio (CBR)

The ratio expressed as a percentage between a test load and an arbitrarily defined standard load. This test load is that required to cause a plunger of standard dimensions to penetrate at a specified rate into a specifically prepared soil specimen.

Commercial Vehicle

A vehicle having at least one axle with dual wheels and/or having more than two axles.

Course

One or more layers of the same material within a pavement structure.

Curvature Function

Of a deflection bowl is the difference in maximum deflection at a test site and the deflection at a point 200 mm from the point at which the maximum deflection was produced (in the direction of travel).

Cemented Materials

Those produced by addition of cement, lime or other hydraulically binding agent to granular materials in sufficient quantities to produce a bound layer with significant tensile strength.

Deflection

The vertical elastic (recoverable) deformation of a pavement surface between the tyres of a standard axle.

Design Period

A period considered appropriate to the function of the road. It is used to determine the total traffic for which the pavement is designed.

Design Subgrade Level (DSL)

The level of the prepared formation after completion of stripping and excavation or filling and upon which the pavement is to be constructed. (Design Subgrade Level = Finished Surface Level-Nominated Pavement Thickness).

Layer

The portion of a pavement course placed and compacted as an entity.

Modified Materials

Granular materials to which small amounts of stabilising agent have been added to improve their performance (eg. by reducing plasticity) without causing a significant increase in structural stiffness. Modified materials are considered to behave as unbound materials.

Modulus of Subgrade Reaction

The slope of the straight line drawn from the origin to a given point on the stress deflection curve obtained from a plate bearing test.

Pavement (Structure)

The portion of the road, excluding shoulders, placed above the design subgrade level for the support of, and to form a running surface for, vehicular traffic.

Permeability Reversal

Occurs at a pavement layer interface when the coefficient of saturated permeability of the upper layer is at least 100 times greater than that of the layer below it.

Roughness

The roughness of the pavement surface in counts/km as measured by a NAASRA Roughness Meter.

Shoulder

The portion of the road contiguous and flush with the pavement.

Stabilisation

The treatment of a road pavement material to improve it or to correct a known deficiency and thus enhance its ability to perform its function in the pavement.

Standard Axle

Single axle with dual wheels loaded to a total mass of 8.2t.

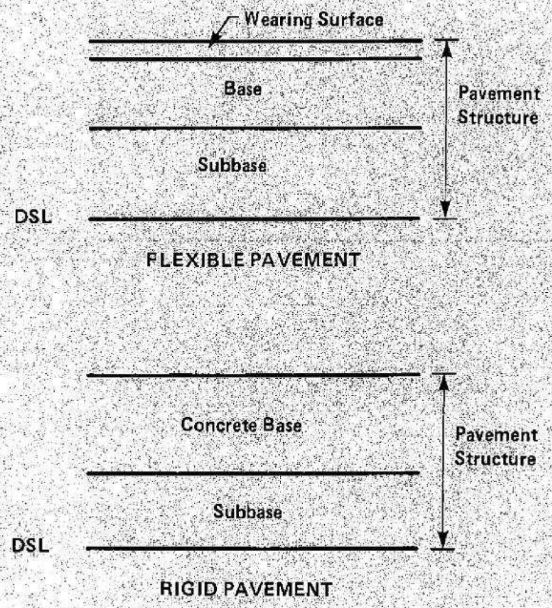
Traffic Lane

The portion of a carriageway alloted for use of a single lane of vehicles.

The components of flexible and rigid road pavement structures are shown in Figure A.1. ❑

TABLE A.1 DEFINITION OF ROAD CLASSES

RURAL AREAS	
Class 1	Those roads which form the principal avenue for communications between major regions of Australia, including direct connections between capital cities.
Class 2	Those roads, not being Class 1, whose main function is to form the principal avenue of communication for movements : • between a capital city and adjoining states and their capital cities; or • between a capital city and key towns; or • between key towns.
Class 3	Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements : • between important centres and the Class 1 and Class 2 roads and/or key towns; or • between important centres; or • of an arterial nature within a town in a rural area.
Class 4	Those roads, not being Class 1, 2 or 3, whose main function is to provide access to abutting property (including property within a town in a rural area).
Class 5	Those roads which provide almost exclusively for one activity or function which cannot be assigned to Classes 1, 2, 3 or 4.
URBAN AREAS	
Class 6	Those roads whose main function is to perform the principal avenue of communication for massive traffic movements.
Class 7	Those roads, not being Class 6, whose main function is to supplement the Class 6 roads in providing for traffic movements or which distribute traffic to local street systems.
Class 8	Those roads not being Class 6 or 7, whose main function is to provide access to abutting property.
Class 9	Those roads which provide almost exclusively for one activity or function and which cannot be assigned to Classes 6, 7 or 8.



NOTES

1. DSL = Design Subgrade Level
2. Base or Subbase may comprise more than one layer
3. Wearing surface of a flexible pavement may be asphalt or a bituminous seal and may contain more than one layer
4. Subbase may comprise more than one course
5. In a rigid pavement the concrete may be provided with an asphalt wearing surface
6. Subgrade material which has been stabilised is generally considered to be a subbase course

FIGURE A.1 COMPONENTS OF FLEXIBLE AND RIGID ROAD PAVEMENT STRUCTURES

APPENDIX E
METHODS FOR CHARACTERISING INITIAL DAILY TRAFFIC

Method 1

Determine, for each load range for each type of axle group, the number of Standard Axles which produce the same damage as one pass of the axle group, using the following formula :

$$F_{Aij}\ (\text{or } F_{Cij} \text{ or } F_{Sij}) = \left[\frac{L_{ij}}{L_{Si}}\right]^{EXP}$$

where

L_{ij} = jth load magnitude on axle type i

L_{Si} = magnitude of Standard Load on axle type i (Table 7.1)

EXP = exponent contained in the relation between limiting strain and strain repetitions which defines the performance of asphalt, cemented material or subgrade as applicable.

The values of F_{Aij}, F_{Cij} and F_{Sij} contained in Tables E1, E2, E3 respectively were derived using the above formula and the exponents 5, 18 and 7.14. These exponents are derived from the performance criteria in Figure 6.8, Figure 6.1 and equation 5.1 (Section 5.9).

If the designer wishes to use other performance criteria, the above formulas should be used to recalculate the entries in Tables E1, E2, and E3.

Calculate for each relevant damage mode, the number of Standard Axles (N_S) which is equivalent to the initial daily traffic, using the following equations:

For asphalt distress

$$N_{SA} = \sum_j N_{A1j}F_{A1j} + \sum_j N_{A2j}F_{A2j} + \sum_j N_{A3j}F_{A3j} + \sum_j N_{A4j}F_{A4j}$$

Where N_{Aij} is the average daily number of axles (in the first year of type i carrying a load of magnitude j.

For damage of cemented materials

$$N_{SC} = \sum_j N_{A1j}F_{C1j} + \sum_j N_{A2j}F_{C2j} + \sum_j N_{A3j}F_{C3j} + \sum_j N_{A4j}F_{C4j}$$

For subgrade damage

$$N_{SS} = \sum_j N_{A1j}F_{S1j} + \sum_j N_{A2j}F_{S2j} + \sum_j N_{A3j}F_{S3j} + \sum_j N_{A4j}F_{S4j}$$

with the summations being taken over the appropriate load ranges.

These three quantities characterise the initial daily traffic for the mechanistic procedure.

TABLE E1
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT ASPHALT DAMAGE ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Aij})

Load on Axle Group (kN)	Number of Standard Axles for equivalent asphalt distress axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0.01	0	0	0
30	0.06	0.01	0	0
40	0.25	0.03	0	0
50	0.75	0.10	0.01	0
60	1.9	0.24	0.02	0
70	4.0	0.51	0.04	0.01
80	7.8	1.0	0.07	0.02
90		1.8	0.13	0.03
100		3.1	0.22	0.05
110		4.9	0.36	0.08
120		7.6	0.56	0.13
130			0.83	0.19
140			1.2	0.28
150			1.7	0.39
160			2.3	0.54
170			3.2	0.73
180			4.2	0.97
190			5.5	1.3
200			7.1	1.6
210			9.1	2.1
220				2.7
230				3.3
240				4.1
250				5.0
260				6.1
270				7.4
280				8.9

TABLE E2
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT DAMAGE TO CEMENTED MATERIALS, ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Cij})

Load on Axle Group (kN)	Number of Standard Axles for equivalent damage of cemented materials axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0	0	0	0
30	0	0	0	0
40	0.01	0	0	0
50	0.35	0	0	0
60	9.3	0.01	0	0
70	150	0.09	0	0
80	1654	1	0	0
90		8.3	0	0
100		55.5	0.01	0
110		309	0.03	0
120		1478	0.12	0
130			0.51	0
140			1.9	0.01
150			6.7	0.03
160			21.3	0.11
170			63.4	0.32
180			177	0.91
190			469	2.4
200			1182	6.0
210			2884	14.5
220				33.5
230				74.6
240				161
250				335
260				678
270				1338
280				2574
290				4841

TABLE E3
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT SUBGRADE DAMAGE ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{sij})

Load on Axle Group (kN)	Number of Standard Axles for equivalent subgrade damage axle / tyres			
	Single single	Single dual	Tandem dual	Triaxle dual
20	0	0	0	0
30	0.02	0	0	0
40	0.13	0.01	0	0
50	0.66	0.04	0	0
60	2.4	0.13	0	0
70	7.3	0.39	0.01	0
80	18.9	1.0	0.02	0
90		2.3	0.06	0.01
100		4.9	0.12	0.01
110		9.7	0.23	0.03
120		18.1	0.43	0.05
130			0.76	0.09
140			1.3	0.16
150			2.1	0.26
160			3.4	0.42
170			5.2	0.64
180			7.8	0.96
190			11.5	1.4
200			16.5	2.0
210			23.5	2.9
220				4.0
230				5.5
240				7.5
250				10.0
260				13.3
270				17.4
280				22.5
290				29.0

Method 2

(i) Estimate the daily number of each of the 4 types of axle groups listed in Table E4. Designate these as $N_{A1}, N_{A2}, N_{A3}, N_{A4}$

(ii) Estimate the number of ESAs for each type of axle group (F_1, F_2, F_3, F_4) from Table E4 or other relevant information

(iii) Calculate initial daily ESAs (N) as follows:

$$N_E = N_{A1} F_1 + N_{A2} F_2 + N_{A3} F_3 + N_{A4} F_4$$

Method 3

(i) Estimate AADT for the design lane and percent commercial vehicles (C%) from traffic census information

(ii) Estimate the number of ESAs per commercial vehicle (F) from Table E5 or other relevant information

(iii) Calculate initial daily ESAs (N) as follows:

$$N_E = AADT\ F\ C / 100$$

Method 4

Calculate initial daily ESAs (N_E) as follows:

$$N_E = \sum_j N_{A1j} F_{E1j} + \sum_j N_{A2j} F_{E2j} + \sum_j N_{A3j} F_{E3j} + \sum_j N_{A4j} F_{E4j}$$

where N_{Aij} is the average daily number of axles (in the first year) of type i, carrying a load of magnitude j and F_{Eij} is the number ESAs for each pass of the axle group i carrying load j with the summations being taken over the appropriate load ranges. Values for F_{Eij} are contained in Table E6.

TABLE E4
NUMBER OF ESAs PER AXLE GROUP TYPE ACCORDING TO STATE AND ROAD FUNCTIONAL CLASS (FACTOR F_i)

Road Functional Class[1]	Axle Group Type	State/Territory							
		NSW	VIC	QLD	WA	SA	TAS	ACT	NT
1	SAST	0.6	0.6	0.4	0.5	0.7	0.4	-	0.4
	SADT	0.4	0.5	0.3	0.4	0.4	0.3	-	0.2
	TADT	0.9	0.9	0.7	0.7	0.9	0.6	-	0.7
	TRDT	0.8	0.7	0.6	0.7[2]	0.6	0.4[2]	-	0.6
2	SAST	0.6	0.4	0.4	0.5	0.5	0.4	-	-
	SADT	0.5	0.3	0.3	0.4	0.3	0.3	-	-
	TADT	1.0	0.7	0.7	1.0	0.9	0.9	-	-
	TRDT	0.7	0.4	0.6	0.5	0.6[2]	0.5[2]	-	-
3	SAST	0.6	0.4	0.4	0.5	0.5	0.4	-	0.5
	SADT	0.6[2]	0.4	0.2	0.3	0.3	0.3	-	0.5
	TADT	1.0	0.7	0.7	0.8	0.7	1.1	-	0.8
	TRDT	0.8[2]	0.4[2]	0.5[2]	0.9[2]E	0.7	0.8[2]E	-	0.6
6	SAST	0.6	0.4	0.3	0.4	0.5	0.3	0.3	-
	SADT	0.4	0.3	0.2	0.3	0.2	0.2	0.2[2]	-
	TADT	1.0	0.6	0.7	1.2	0.8	0.7	0.8	-
	TRDT	0.8	0.4	0.6[2]	0.8[2]	0.6	0.5[2]	-	-
7	SAST	0.6	0.3	0.3	0.3	0.2E	0.1E	-	-
	SADT	0.6[2]	0.2	0.2	0.2	0.3E	0.4E	-	-
	TADT	1.6	0.7	0.6	1.2	0.3[2]E	1.2[2]E	-	-
	TRDT	-	-	-	-	-	-	-	-

1 Road Functional Classes are defined in Appendix A
2 Average based on a sample of between 50 and 100 axle groups
E Extrapolated from 1973 survey data

TABLE E5
NUMBER OF ESAs PER COMMERCIAL VEHICLE ACCORDING TO STATE AND ROAD FUNCTIONAL CLASS (FACTOR F)

Road Functional Class [1]	State/Territory NSW	VIC	QLD	WA	SA	TAS	ACT	NT
1	1.8	1.9	1.5	1.5	2.0	1.1	-	1.9
2	2.1	1.2	1.1	2.2	1.6	1.4	-	-
3	1.9	1.2	1.2	1.6	1.5	1.6	-	2.5
6	1.9	1.0	1.1	1.5	1.5	0.9	-	-
7	2.7	0.9	0.9	1.2	0.5E	0.7E	-	-

1 Road Functional Classes are defined in Appendix A
E: Extrapolated from 1973 survey data

TABLE E6
NUMBER OF ESAs PER AXLE GROUP ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD (FACTOR F_{Eij})

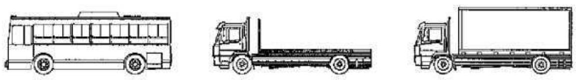
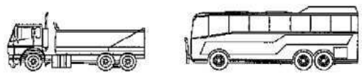
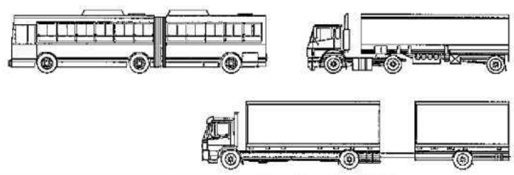
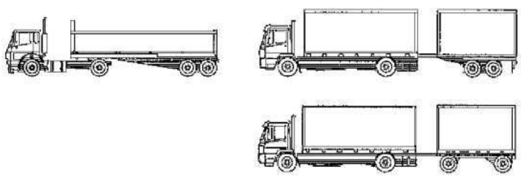
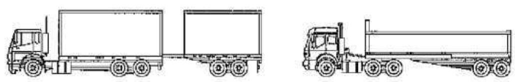
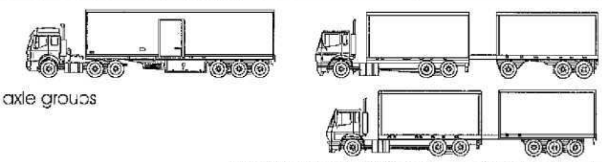
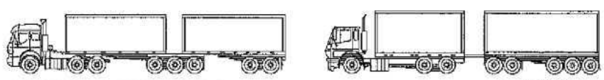
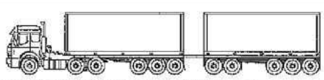
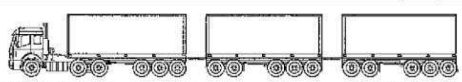
Load on Axle Group (kN)	Number of ESAs, axle / tyres: Single single	Single dual	Tandem dual	Triaxle dual
20	0.02	0	0	0
30	0.10	0.02	0	0
40	0.32	0.06	0.01	0
50	0.79	0.15	0.02	0.01
60	1.6	0.32	0.04	0.01
70	3.0	0.59	0.07	0.02
80	5.2	1.0	0.12	0.04
90		1.6	0.20	0.06
100		2.4	0.30	0.09
110		3.6	0.44	0.14
120		5.1	0.62	0.19
130			0.86	0.27
140			1.2	0.36
150			1.5	0.47
160			2.0	0.61
170			2.5	0.78
180			3.2	0.98
190			3.9	1.2
200			4.8	1.5
210			5.9	1.8
220				2.2
230				2.6
240				3.1
250				3.6
260				4.3
270				5.0
280				5.7
290				6.6

TABLE E2
NUMBER OF STANDARD AXLES PER AXLE GROUP FOR EQUIVALENT DAMAGE TO CEMENTED MATERIALS, ACCORDING TO TYPE OF AXLE GROUP AND AXLE GROUP LOAD, (FACTOR F_{CIJ})

Load on Axle Group (kN)	Number of Standard Axles for equivalent damage of cemented materials axle/tyres			
	Single Single	Single Dual	Tandem Dual	Triaxle Dual
20	0	0	0	0
30	0	0	0	0
40	0.03	0	0	0
50	0.50	0	0	0
60	4.43	0.03	0	0
70	28.2	0.20	0	0
80	139.9	1.00	0	0
90		4.11	0.01	0
100		14.6	0.03	0
110		45.7	0.09	0
120		129.7	0.24	0.01
130			0.64	0.02
140			1.55	0.05
150			3.54	0.10
160			7.68	0.23
170			15.9	0.47
180			31.6	0.94
190			60.4	1.79
200			111.8	3.31
210			200.7	5.95
220				10.4
230				17.7
240				29.5
250				48.2
260				77.2
270				121.4
280				187.8
290				286.2

VEHICLE CLASSIFICATION SYSTEM

AUSTROADS

CLASS	LIGHT VEHICLES	
1	SHORT Car, Van, Wagon, 4WD, Utility, Bicycle, Motorcycle	
2	SHORT - TOWING Trailer, Caravan, Boat	
	HEAVY VEHICLES	
3	TWO AXLE TRUCK OR BUS *2 axles	
4	THREE AXLE TRUCK OR BUS *3 axles, 2 axle groups	
5	FOUR (or FIVE) AXLE TRUCK *4 (5) axles, 2 axle groups	
6	THREE AXLE ARTICULATED *3 axles, 3 axle groups	
7	FOUR AXLE ARTICULATED *4 axles, 3 or 4 axle groups	
8	FIVE AXLE ARTICULATED *5 axles, 3+ axle groups	
9	SIX AXLE ARTICULATED *6 axles, 3+ axle groups or 7+ axles, 3 axle groups	
	LONG VEHICLES AND ROAD TRAINS	
10	B DOUBLE or HEAVY TRUCK and TRAILER *7+ axles, 4 axle groups	
11	DOUBLE ROAD TRAIN *7+ axles, 5 or 6 axle groups	
12	TRIPLE ROAD TRAIN *7+ axles, 7+ axle groups	

Dwg No: 0293-009

Asset and Network Information - January 2002

Appendix B

Cost Summary Report

COST SUMMARY REPORT

DEVELOPMENT APPLICATION / COMPLYING DEVELOPMENT CERTIFICATE NO.

APPLICANT'S NAME: ______________________________

APPLICANT'S ADDRESS: ______________________________

____

LOCATION OF PROPOSED DEVELOPMENT: ______________________________

____

ANALYSIS OF DEVELOPMENT COSTS:

Demolition and excavation	$
Decontamination and remediation	$
Site preparation	$
Building construction	$
Hydraulic, mechanical or fire services	$
External works and services	$
Sub-total carried forward	$
Preliminaries and margin	$
Sub-total	$
Consultant fees	$
Other related development costs	$
Sub-total	$
Good and Services Tax	$
TOTAL PROPOSED COST OF DEVELOPMENT	$

I CERTIFY THAT I HAVE:

⇨ inspected the plans the subject of the application for development consent or complying development certificate;

⇨ calculated the development costs in accordance with the definition of proposed cost of development in clause 25J of the Environmental Planning and Assessment Regulation 2000 at current prices; and

⇨ included GST in the calculation of proposed cost of development.

Signed: ______________________________

Name: ______________________________

Position and Qualifications: ______________________________

Date: ______________________________

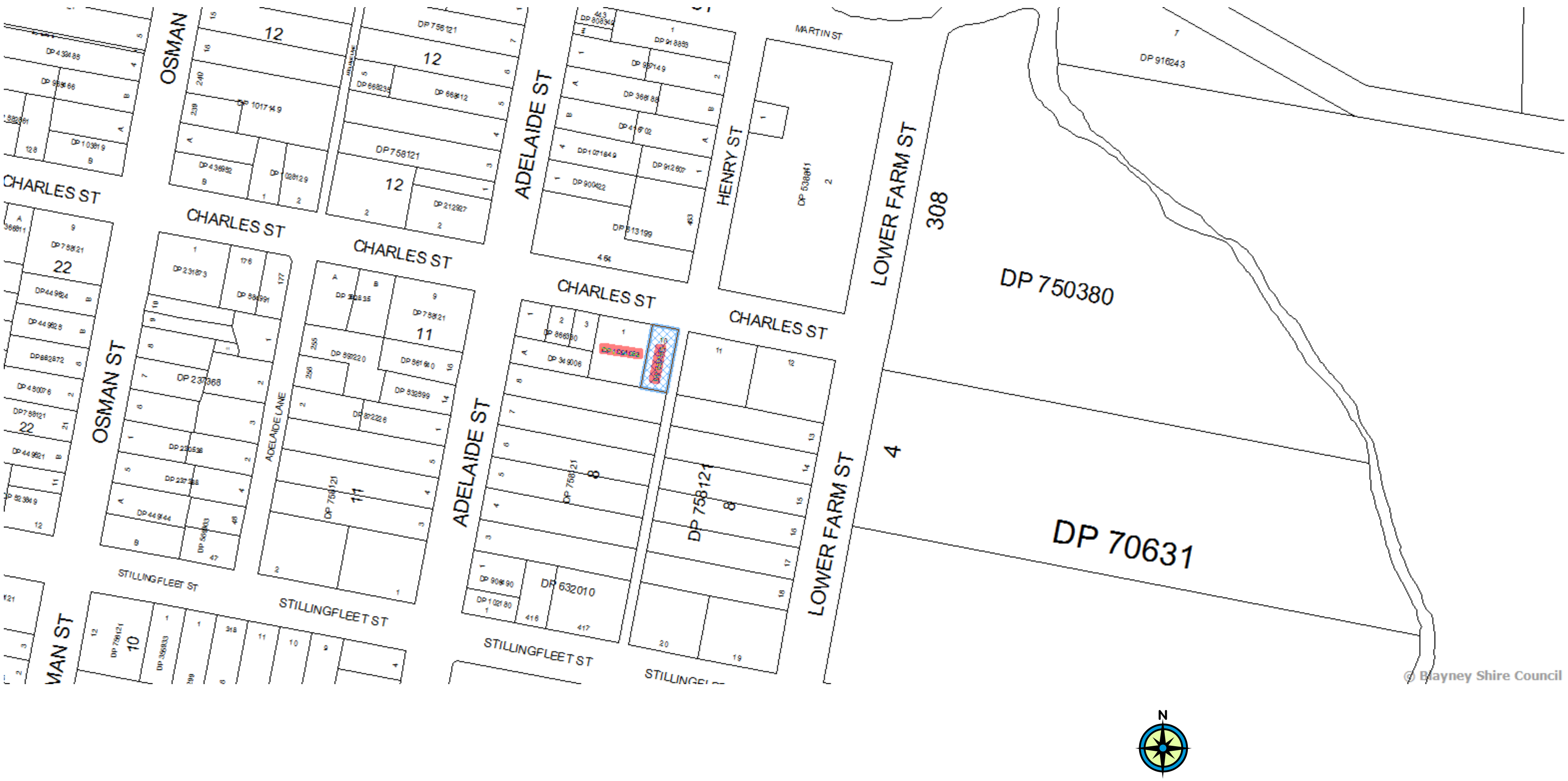
Contribution comparison table: urban residential release area contributions in selected regional LGAs

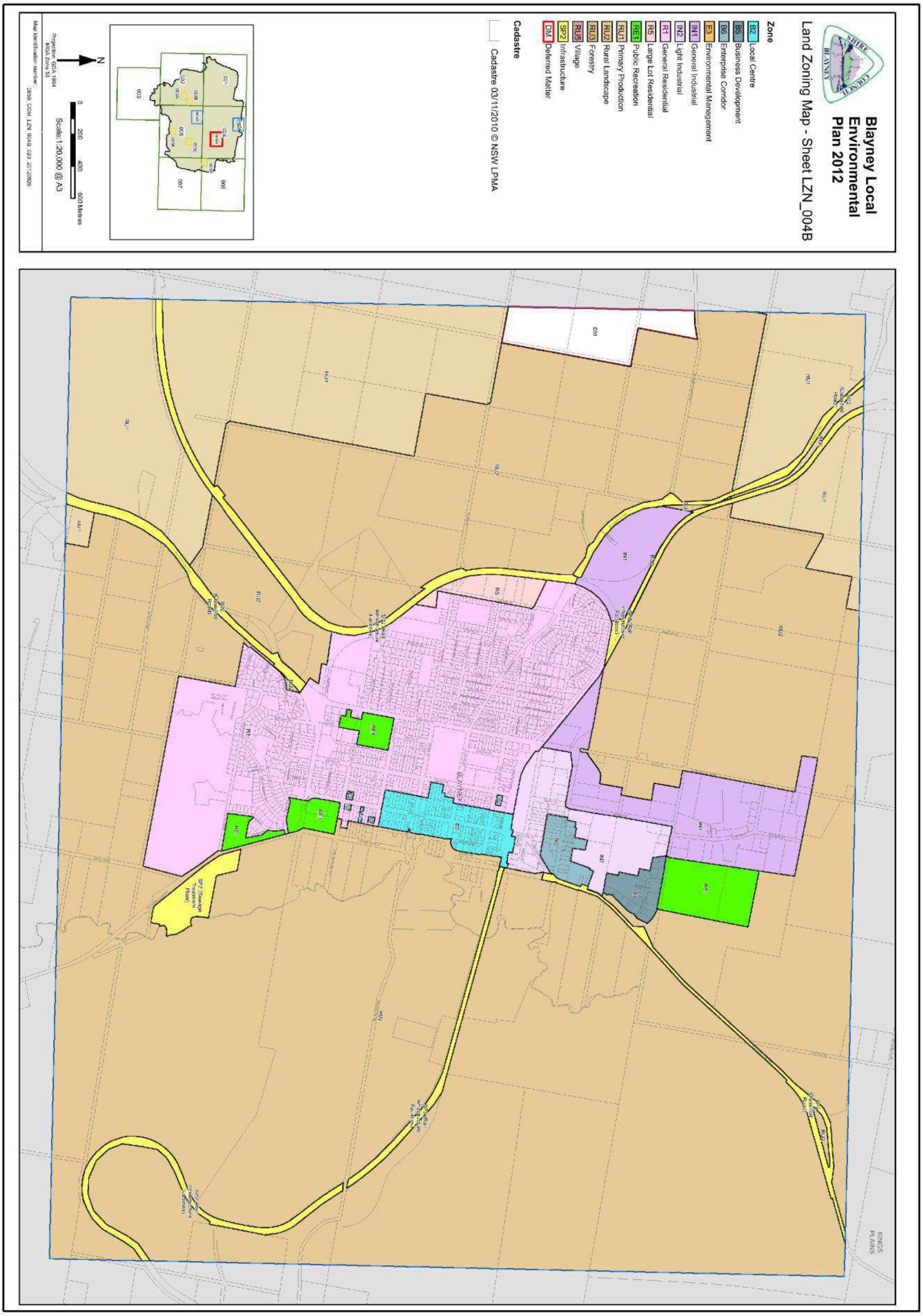
NSW LGA / urban residential release area	Water DSP charge (per lot or ET)	Sewer DSP charge (per lot or ET)	Section 94 or section 94A contribution (per lot or ET)	Total developer contribution charges (per lot or ET)
Bathurst				
Windradyne	$2,665[1]	$2,369[2]	$4,371[3]	$9,405
Robin Hill	$4,767[4]	N/A	$15,351[5]	$20,118
Cabonne				
Molong	$6,485[6]	$5,064[7]	$3,320[8]	$14,869
Cowra				
East Cowra	$8,465[9]	$4,933[10]	$5,197[11]	$18,595
West Cowra	$3,303[12]	$4,933	$3,988	$12,224
North Cowra	N/A	$4,933	$2,223[13]	$7,156
Orange				
Bloomfield	$7,146[14]	$3,955	$14,405[15]	$25,506
North West Orange	As above	As above	$16,941	$28,042
Ploughmans Valley	As above	As above	$17,531	$28,632
Waratah	As above	As above	$19,231	$30,332

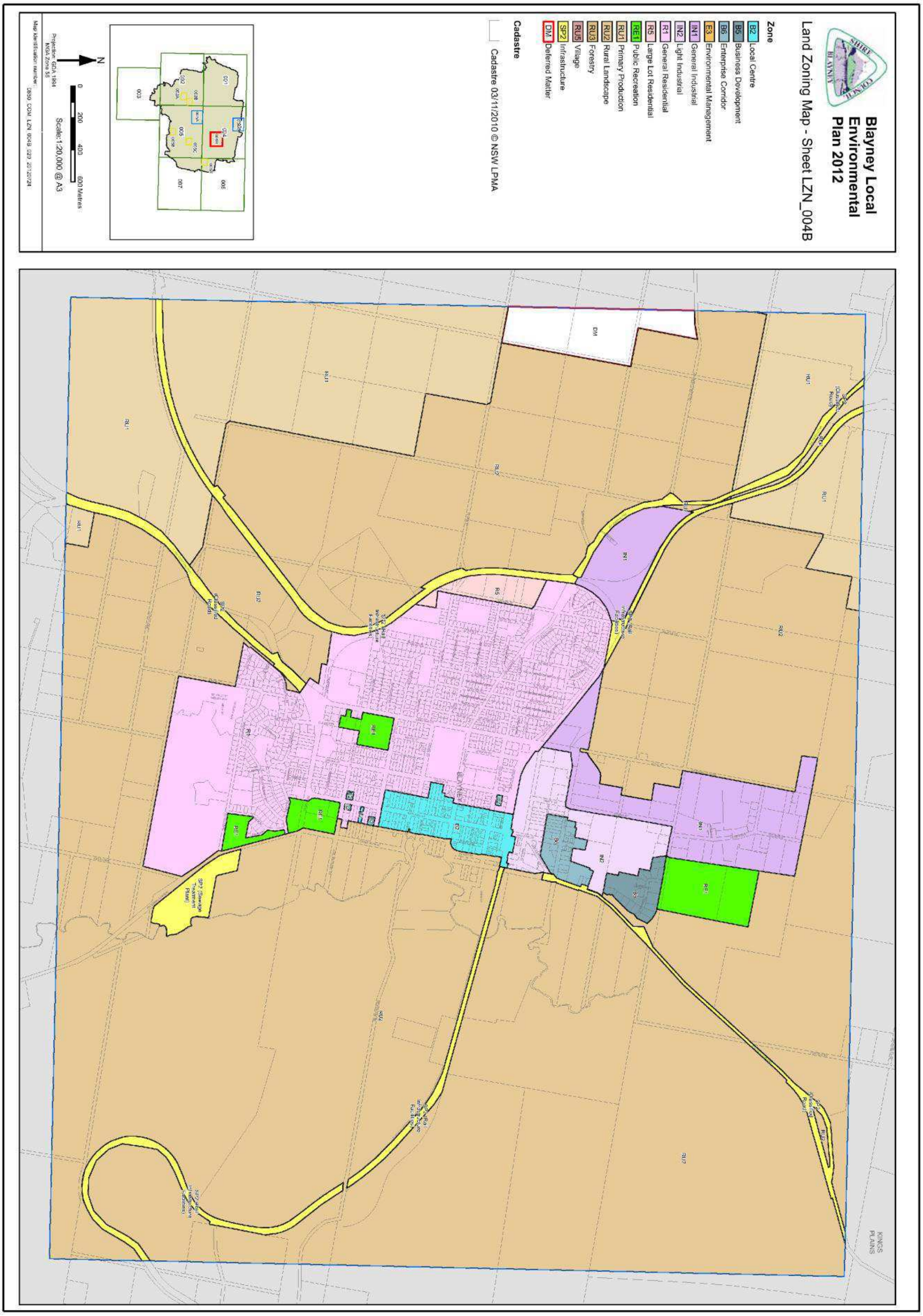
[1] Water headworks charges for Windradyne as printed in 2011/2012 Revenue Policy (fees and charges).
[2] Sewer headworks charges for Windradyne as printed in 2011/2012 Revenue Policy (fees and charges).
[3] Section 94 contributions charges made up of community facilities and road works, as printed in 2011/2012 Revenue Policy (fees and charges).
[4] Water headworks charges for Robin Hill as printed in 2011/2012 Revenue Policy (fees and charges).
[5] Section 94 contributions charges is an average (of sub-areas) made up of roads and drainage, as printed in 2011/2012 Revenue Policy (fees and charges).
[6] Water headworks charges as printed in 2011/2012 Cabonne Council fees and charges.
[7] Sewer headworks charges as printed in 2011/2012 Cabonne Council fees and charges.
[8] Section 94 contributions charges made up of road works and bushfire hazard facilities, as contained in Cabonne Council 2011/2012 fees and charges.
[9] East Cowra water headworks charges have been indexed by 3% per annum (2 years) from rate contained in 2009/2010 Cowra Management Plan.
[10] Cowra sewer headworks charges have been indexed by 3% per annum (2 years) from the rate contained in 2009/2010 Cowra Management Plan.
[11] Cowra section 94 contributions charges are made up of roads, bushfire, open space, community, plan preparation and administration. Rate has been indexed by 3% per annum (5 years) from rates contained in contributions plan 2006.
[12] West Cowra contribution rate has been indexed by 3% per annum (2 years) from the rate contained in 2009/2010 Cowra Management Plan.
[13] North Cowra contributions rate is made up of open space, community, plan management/ administration and the open space component consists of land dedication and embellishment. The rate has been indexed by 3% per annum (5 years) from rate in the 2006 plan.
[14] Water and sewer headworks charges as at October 2012.
[15] All urban release area contributions charges are made up of open space, community/cultural, roads/cycleways, stormwater drainage, local area facilities, plan preparation/administration. As contained in Orange Contributions Plan 2012.

NSW LGA / urban residential release area	Water DSP charge (per lot or ET)	Sewer DSP charge (per lot or ET)	Section 94 or section 94A contribution (per lot or ET)	Total developer contribution charges (per lot or ET)

Location Plan




Blayney Local Environmental Plan 2012
Land Zoning Map - Sheet LZN_004B
Zone
B2 Local Centre
B5 Business Development
B6 Enterprise Corridor
E3 Environmental Management
IN1 General Industrial
IN2 Light Industrial
R1 General Residential
R5 Large Lot Residential
RE1 Public Recreation
RU1 Primary Production
RU2 Rural Landscape
RU3 Forestry
RU5 Village
SP2 Infrastructure
DM Deferred Matter
Cadastre
Cadastre 03/11/2010 © NSW LPMA
Scale: 1:20,000 @ A3
BLAYNEY
KINGS PLAINS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RU3 Forestry
RU5 Village
SP2 Infrastructure
DM Deferred Matter
Cadastre
Cadastre 03/11/2010 © NSW LPMA
Scale: 1:20,000 @ A3
KINGS PLAINS

View from subject land to opposite side of road. Streetscape looking towards west.

Streetscape looking west on same side as subject land.

View of property across road from subject land.

View of property across road from subject land.

Subject land. Vacant land located east side of existing shed: Lot 10 DP 667562


Commercial premises on adjoining land: Lot 1 DP 1094068

Subject land view from across the road.

View of Charles Street looking east

View of agricultural block on the eastern side of vacant subject land.

MINUTES OF THE BLAYNEY TRAFFIC COMMITTEE MEETING
HELD ON FRIDAY 15 FEBRUARY 2013
AT THE BLAYNEY SHIRE COMMUNITY CENTRE

Meeting commenced at 10.10am

PRESENT

Cr David Kingham (Chair), Jackie Barry (Roads and Maritime Services), Peter Foran (NSW Police), Ben McFarlane (NSW Police) Reg Rendall (Paul Toole Representative), Grant Baker (Blayney Shire Council), Geoff Paton (Blayney Shire Council) and Lauren Fuller (Blayney Shire Council).

APOLOGIES

RESOLVED: That the apologies received from Cr Kevin Radburn (Chair) and Iris Dorsett (Road Safety Officer) be accepted. (Reg Rendall/Grant Baker)

CONFIRMATION OF MINUTES

RESOLVED: That the minutes of the previous Traffic Committee Meeting held on Friday 14 December 2012 be confirmed to be a true and accurate record of that meeting. (Grant Baker/Reg Rendall)

PRESENTATION – BLAYNEY TO BATHURST CYCLO SPORTIF

Presentation from Garry Taunton, Kevin Young, Paul Field and Amanda Baker on the Blayney to Bathurst Cyclo Sportif event to be held on Sunday 21 April 2013. The Traffic Management Plan was tabled and discussed at length.

TRAFFIC REGISTER

Update provided and information noted.

CORRESPONDENCE

Millthorpe Markets Traffic Concerns
Correspondence noted.

Parking of Buses in Hill Street, Blayney
RESOLVED: That this correspondence be referred to Grant Sharkey, Safety Around Schools Officer at the Roads and Maritime Services, and a reply be sent to the correspondent advising of this. (Jackie Barry/Peter Foran)

Ben McFarlane (NSW Police) joined the meeting at approximately 11.15am.

St Joseph's School Parking Concerns and Request for Extension of Footpath
RESOLVED: That this correspondence be referred to Grant Sharkey, Safety Around Schools Officer at the Roads and Maritime Services, and a reply be sent to the correspondent advising of this. (Jackie Barry/Peter Foran)

Bathurst Regional Council Conditions for Blayney to Bathurst Cyclo Sportif
Conditions noted.

GENERAL BUSINESS

Blayney to Bathurst Cyclo Sportif
Report was tabled.
RESOLVED: That the Traffic Committee provide in principal support pending the receipt of a revised Traffic Management Plan as per discussions during the presentation at the commencement of this meeting. The Event Organiser is to comply with the following:

a. Development and implementation of a Traffic Management Plan which shall include Traffic Control Plans. All implementation and Traffic Control works and Plans are to be completed by persons qualified to do so.
b. Approval is to be obtained from the Roads and Maritime Services Traffic Operations Manager.
c. Approval is to be obtained from NSW Police. Police require 30 days prior notice.
d. Escort vehicles to be leading and following the participants at all times.
e. Council is to be provided with a copy of a $20M Public Liability Insurance Policy indicating Blayney Shire Council's interests, with the date and location of the event.
f. The Event Organiser is to notify all Emergency Services of the event including Blayney Hospital.
g. The Event Organiser is to notify all business proprietors and residents affected by the event at least 7 days prior to the event.
h. The Event Organiser is to comply with the requirements of the "Guide to Traffic and Transport Management for Special Events" (Version 3.4), 2 August 2006, for a Class 1 event.
i. The Event Organiser is to comply with the requirements of the "Guide for Bicycle Road Races" NSW 1 January 2004.
j. Approval is to be obtained from Bathurst Regional Council.

Traffic Committee to investigate modifying Traffic Control Plan to lower speed limit on roads not fully closed during the event.

Camp Quality Tractor Trek – 19 to 21 September 2013
RESOLVED: That approval be granted for the Camp Quality Tractor Trek with conditions to be in line with Bathurst Traffic Committee and Roads and Maritime Services approval. (Peter Foran/Reg Rendall)

Orange Cycling and Triathlon Club – 2013 Club Racing Program
Information tabled.
RESOLVED: That the Traffic Committee provide in principal support for the Orange Cycling and Triathlon Club summer series, up to and including 11 May 2013, subject to the following conditions:

a. Development and implementation of a Traffic Management Plan which shall include Traffic Control Plans. All implementation and Traffic Control works and Plans are to be completed by persons qualified to do so.
b. Approval is to be obtained from NSW Police. Police require 30 days prior notice.
c. Council is to be provided with a copy of a $20M Public Liability Insurance Policy indicating Blayney Shire Council's interests, with the date and location of the event.
d. The Event Organiser is to notify all Emergency Services of the event including Blayney Hospital.
e. The Event Organiser is to notify all business proprietors and residents affected by the event at least 7 days prior to the event.
f. The Event Organiser is to comply with the requirements of the "Guide to Traffic and Transport Management for Special Events" (version 3.4), 2 August 2006, for a Class 3 event.
g. The Event Organiser is to comply with the requirements of the "Guide for Bicycle Road Races" NSW 1 January 2004.
h. Numbers are limited to 20 participants. (Reg Rendall/Peter Foran)

Council support will be provided to the organising committee on what information is required and how it should be put together. Additional conditions may be imposed for events of greater than 20 participants.

INFORMAL MATTERS

Monthly Road Safety Reports for December 2012 and January 2013
Reports were noted.

CENTROC Weight of Loads Group Fold
The CENTROC Weight of Loads Group will wind up as of 30 June 2013 due to declining membership and increased financial pressures. Council will be looking at the possibility of joining another Weight of Loads Group or a 'user-pay' service through Roads and Maritime Services.

Speeding Vehicles in Binstead Street, Blayney
Concerns with vehicle/s travelling at high speeds in Binstead Street between 4.30am and 6.00am.
RESOLVED: That traffic counters be put in place and information recorded be given to NSW Police.

Speed Zone Review
Jackie Barry currently working on the Speed Zone Review for Forest Reefs Road. Speed Zone Review for MR245 not complete as yet.

FUTURE MEETING DATES FOR 2013

The Traffic Committee meeting dates for 2013 are as follows
- Friday 19 April 2013
- Friday 21 June 2013
- Friday 16 August 2013
- Friday 18 October 2013
- Friday 13 December 2013

MEETING CLOSE

The meeting closed at 12.55pm.